EFFICACY OF SCAPULAR STABILIZATION EXERCISES IN PATIENTS WITH MECHANICAL NECK PAIN

Dissertation submitted in

partial fulfillment

for the degree of

MASTER OF PHYSIOTHERAPY

(ORTHOPAEDICS)

The Tamil Nadu Dr. M.G.R. Medical University

Chennai

May 2018

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the research work entitled **"EFFICACY OF SCAPULAR STABILIZATION EXERCISES IN PATIENTS WITH MECHANICAL NECK PAIN"** was carried out by **Reg. No. 271610246,** of P.S.G. College of Physiotherapy, towards the partial fulfillment for the degree of **MASTER OF PHYSIOTHERAPY (Physiotherapy in Orthopaedics),** affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai.

Internal Examiner **External Examiner**

Date of Evaluation:

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the research work entitled **"EFFICACY OF SCAPULAR STABILIZATION EXERCISES IN PATIENTS WITH MECHANICAL NECK PAIN"** was carried out by **PRIYA.S, Reg. No. 271610246** of P.S.G. College of Physiotherapy, towards the partial fulfillment for the degree of **MASTER OF PHYSIOTHERAPY (Physiotherapy in Orthopaedics)** affiliated to The Tamil Nadu Dr. M.G.R. Medical University Chennai.

Prof. R. MAHESH MPT,

PRINCIPAL,

P.S.G College of Physiotherapy

Coimbatore – 641 004.

Place: Coimbatore

Date:

PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

CERTIFICATE

This is to certify that the dissertation work entitled **"EFFICACY OF SCAPULAR STABILIZATION EXERCISES IN PATIENTS WITH MECHANICAL NECK PAIN"** was carried out by **PRIYA.S, Reg. No. 271610246** of P.S.G. College of Physiotherapy, Coimbatore, affiliated to The Tamil Nadu Dr. M.G.R. Medical University Chennai, under our guidance.

Guide
Prof. R. MAHESH, MPT
Principal,
P.S.G. College of Physiotherapy,
Coimbatore - 641 004.

Co-Guide
Mr. B. NAGARAJ, MPT,
Assistant Professor,
P.S.G. College of Physiotherapy,
Coimbatore- 641 004.

Place: Coimbatore

Date:

ACKNOWLEDGEMENT

First and foremost, I thank **LORD ALMIGHTY** for showering me with his divine blessing, enriched love and matchless grace which gave me inner strength and guidance that carried me throughout my study.

I am deeply indebted to **MY GRAND PARENTS, MY PARENTS and MY BROTHER,** for their unconditioned love, sincere prayers, unstinted support and care without which I would not have accomplished anything.

It is the pleasant duty to express my sincere gratitude to **Prof. Mr. R. MAHESH, MPT,** Principal, PSG College of physiotherapy, Coimbatore for his encouragement and inspirations during the course of the study.

I am very grateful to **Dr. B.K. DINAKAR RAI**, **M.S.,** Professor and HOD, Department of Orthopedics & Orthopedic surgery, **Dr. V. RAMAMOORTHY, MD.,** Professor and HOD, Department of PMR, PSG hospitals, Coimbatore for his encouragement, kind, calm, and patient help throughout the study.

The endeavor from search in pursuit dissertation got initiated and fructified under the enlightened guidance of **Prof. Mr. R. MAHESH, MPT** and **Mr. B.NAGARAJ, MPT,** Asst. Professor, my project guides, took extra pains to help me in completing this study. His constant motivation, guidance and valuable suggestions made me to finish this thesis successfully.

I will be thankful to **my staff members of PSG COLLEGE OF PHYSIOTHERAPY** for their kind support during my study.

I am grateful to **Dr. ANIL MATHEW, Ph.D, Professor**, Department of Biostatistics, PSG Institute of Medical Science and Research who helped in statistical method of data analysis.

My special thanks to **Dr. N.RAMKUMAR, MBA., Ph.D, Professor**, Faculty of Human Resource, PSG Institute of management, Coimbatore for his guidance in research and statistical method of data analysis.

I thank all the members of **Institutional Review Committee of Research**, College of Physiotherapy and **Institutional Human Ethics Committee** of PSG Institute of Medical Science and Research for their valuable suggestions to complete the dissertation.

And also I thank to **My Friend VIJAYALAKSHMI, Colleagues**, **Seniors and Juniors** for sharing their knowledge, love, support and exclusive cooperation.

Finally, it would not be meaningful and complete if I fail to mention those who were so co-operative and lovable during the entire course of the study **special thanks to all my beloved patients.**

ABBREVIATIONS

MNP	-	Mechanical Neck Pain
VAS	-	Visual Analogue Scale
NDI	-	Neck Disability Index

CONTENTS

CHAPTER	TITLE	PAGE NO
I	**INTRODUCTION**	**1**
	1.1 Need For The Study	**3**
	1.2 Objective	**3**
	1.3 Hypothesis	**3**
	1.4 Operational Definition	**3**
	1.5 Projected Outcome	**3**
II	**REVIEW OF LITERATURE**	**4**
III	**MATERIALS AND METHODOLOGY**	
	3.1 Materials	**7**
	3.2 Study Design	**7**
	3.3 Study Setting	**7**
	3.4 Human Participants Protection	**7**
	3.5 Population / Participants	**7**
	3.6 Sampling	**7**
	3.7 Criteria For Sample Selection	**8**
	3.7.1 Inclusion Criteria	
	3.7.2 Exclusion Criteria	
	3.8 Study Duration	**8**
	3.9 Treatment Duration	**8**
	3.10 Intervention	**9**
	3.11 Instrument And Tool For Data Collection	**9**
	3.12 Technique Of Data Collection	**9**
	3.13 Technique Of Data Analysis & Interpretation	**10**
IV	**DATA ANALYSIS AND INTERPRETATION**	**13**
V	**RESULTS AND DISCUSSION**	**23**
	5.1 Limitations of the study	**25**
	5.2 Suggestions for future research	**25**
VI	**SUMMARY AND CONCLUSION**	**26**
	BIBLIOGRAPHY	**27**
	ANNEXURE	
	ABSTRACT	

LIST OF ANNEXURES

Annexure	Content
I	Ethical Committee Approval Letter
II	Assessment form
III	Informed Consent (English and Tamil)
IV	Assessment Tool
V	Treatment Protocol

CHAPTER I

INTRODUCTION

Mechanical neck pain is defined as generalized neck pain with mechanical characteristics, including symptoms provoked by neck movements, neck postures and palpation of cervical muscles. It has become increasing problem causing functional disability [(1)]. Mechanical neck pain is generally multi factorial in origin, commonly arises insidiously including one or more of the following: poor posture, anxiety, depression, neck strain and sporting or occupational activities [(2)].

It is the fourth leading causes of disability which will resolve with or without treatment with the annual prevalence rate exceeding 30%, but nearly 50% of individuals will continue to experience some degree of pain or frequent occurrences [(3)]. Common complaint in Neck pain is with limitation of mobility and accompanies neck pain with limited range of motion and subjective feeling of stiffness which is often precipitated or aggravated by neck movements or sustained neck postures [(4)].

Childs published the Neck Pain: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association (CG). This CGs describes evidence-based physical therapy practice for management of patients with musculoskeletal neck pain and state that coordination, strength and endurance deficits may be present in the scapulothoracic muscles [(5)].

Nowadays, abnormal (bad) position maintained for a long period suffer from loading and causes fatigue to that particular muscles related to maintaining the position. The practice of repeatedly maintaining a bad position causes an increase in muscle length following structural weakness of muscles. Abnormal alignment of surrounding body parts or by muscle damage may affect the scapula because it is not connected directly to the trunk but is fixed to the trunk mainly by muscles. A bad influence on the alignment of cervical joints has scapular asymmetry, causing neck pain [(6)].

Normally the scapulothoracic muscles such as the rhomboids, middle trapezius and lower trapezius are thought to contribute to postural stability of the cervical spine and reduce biomechanical loading of cervicoscapular musculature [7]. **Janda** described muscle imbalances as impaired relationships between muscles prone to tightness (stabilizing function) that lose extensibility and those prone to weakness (mobilizing function). It has been suggested that muscle imbalances in the scapulothoracic region occur when the upper trapezius becomes tight and the middle trapezius and lower trapezius become weak [8].

The muscles within the mid back and surrounding scapular region control stability for the entire upper kinetic chain (ie. neck, shoulder and elbow). They also play a direct role in stability of the neck/cervical spine [9].

Altered scapular orientation most frequently occur because of altered activity or poor neuromuscular patterns in the serratus anterior and trapezius (scapular stability muscles) as well as altered activity and extensibility of the pectoralis minor, levator scapulae and rhomboids that may compromise the muscle balance (scapular mobility muscle). The presence of neck pain is known to alter the activity of the upper and lower trapezius during the upper limb tasks and alter scapula orientation [10]. Biomechanical reasoning indicated that altered activity in the axioscapular muscles associated with the altered scapular orientation may induce detrimental load on cervical spine [11]. Altered stability of the scapula therefore creates or sustains symptomatic mechanical dysfunction in the cervical spine, and influence the recurrence of neck pain [10].

Approximately 60% of the neck pain patients are reported to have forward head posture. Increase the load on the posterior structures such as bones, ligaments, joint capsules and muscles and changes scapular kinematics and kinetics. Abnormal scapular orientations can alter the activation of the stabilization muscles and also the mobilizing muscles [12].

The scapular stabilization exercises follows the basic stabilization training principles of learning motor control by developing awareness of muscle contractions and spinal position [13] used to strengthen the muscles which are responsible for stabilizing the scapula. They also restore the position and movement of scapula to prevent secondary damage and abnormal postures as forward head posture or rounded shoulder.

1.1 NEED FOR THE STUDY

Scapular stabilization exercise proposed as an effective treatment for the shoulder impingement **(Shankar, et al, 2016).** Scapular stabilization exercise given with stretching and strengthening, can be more effective in increasing the muscle strength, developing the Joint Position Sense and decreasing the scapular dyskinesia **(Baskurt, et al, 2011).**

Scapular Stabilization Exercises are commonly applied for shoulder pathology / impingement, but there is lack of evidence on the Scapular Stabilization Exercises in Mechanical neck pain patients. So, this study is sought **to find out the efficacy of Scapular Stabilization Exercises in reducing pain and in improving the functional status in Mechanical Neck Pain patients** to develop evidence by assessing VAS and NDI as outcome measures.

1.2 OBJECTIVE

To determine the efficacy of Scapular Stabilization Exercises in reducing pain and improving functional status in patients with Mechanical Neck Pain.

1.3 HYPOTHESIS

Null hypothesis: There will be no significant difference in Pain Reduction and Functional Status in patients with Mechanical Neck Pain between the groups.

Alternative hypothesis: There will be a significant difference in Pain Reduction and Functional Status in patients with Mechanical Neck Pain between the groups.

1.4 OPERATIONAL DEFINITION

MECHANICAL NECK PAIN

Mechanical Neck Pain commonly arises insidiously and is generally multifactorial in origin, including one or more of the following: poor posture, anxiety, depression, neck strain, carrying laptop bags and sporting or occupational activities [(2)] **(Pranjal Gogoi, 2015).**

1.5 PROJECTED OUTCOME

Based on the literature review, it is expected that the scapular stabilization exercises will reduce the pain and improve the functional status in patients with Mechanical Neck Pain.

CHAPTER – II

REVIEW OF LITERATURE

- **Boyoung Im, et al., 2016** conducted an experimental study on the effects of Scapular Stabilization Exercise on neck posture, muscle activity, pain and quality of life in individuals with neck pain and forward head posture. CV angle, surface electromyography, Visual Analogue Scale (VAS), Neck disability index (NDI), and World Health Organization Quality of Life Assessment-BREF (WHOQOL-BREF) were used as scales. Outcome measures were measured at 4-weeks and concluded that can improve the head posture, pain and quality of life through muscular activities in the patients with neck pain and forward head posture through scapular stabilization exercise.

- **Celenay, et al., (2016)** conducted a randomized controlled trail, to investigate the effectiveness of Cervical and Scapulothoracic Stabilization Exercises with and without connective tissue massage on pain intensity at night, Pressure Pain Threshold (PPT), anxiety state and mental health in patients with Chronic Neck Pain are measured and at 4 weeks. The VAS, PPT – digital algometer, Spielberger State Trait Anxiety Inventory (SSTAI – Turkish version) and quality o life with the Short Form- 36 are used as outcome measures. They concluded that stabilization exercises with the connective tissue massage can improve the pain, the state of anxiety and quality of life.

- **Christensen S.W., et al., (2017)** conducted a cross-sectional study on altered pain sensitivity and axioscapular muscle activity in neck pain patients age group between 18 and 50 years compared with healthy control. Pressure Pain Threshold (PPT), Electromyography (EMG) and visual analogue scale (VAS) are used as outcome measures. They concluded that axioscapular movement causes different responses in pain and muscle activity between the groups as neck pain and controls.

- **Christoffer H. Andersen, et al., (2014)** conducted a RCT study to investigate the effect of Scapular Function Training (SFT) on chronic pain in neck/ shoulder region among adults. Baseline measurements of the participants were tested for maximum isometric strength (SE and SP) and PPT and at 10 weeks. This study concluded that SFT reduces pain intensity and increases the shoulder elevation strength in adults with chronic non specific pain in neck / shoulder region.

- **Dabholkar Ajit S, Yardi Sujata S, (2015)** conducted a cross-sectional study on the scapular muscle strength was evaluated with push- pull dynamometer in 75 subjects with Mechanical Neck Pain. Push-Pull Dynamometer (baseline), VAS, Neck Pain Disability Scale (NPDS – Hindi version), Scapular Dyskinesia Test were used as scales. This study concluded that there exists a trend of global weakness of scapular muscle strength on affected side and highlights that scapula orientation influences cervical pain.

- **Guilherme Trivellato Andrade, et al.,** conducted a study on influence of Scapular Position on Cervical Rotation Range Of Motion among 58 college students. Scapular alignment and cervical rotation range of motion were used as outcome measures. This study concluded that in patients with cervical pain, reduced cervical rotation ROM and depressed scapulae should not automatically attribute to the depressed scapulae position need more studies to understand the contribution of scapular alignment on cervical spin biomechanics and dysfunction.

- **Kamalakannan .M, Anita .A (2015)** conducted an experimental study to find out the effectiveness of Lower Trapezius Exercise among Chronic Neck Pain subjects in pain and disability in 43 subjects. The outcome measures used were Numeric Rating Scale for Pain, Neck Disability Index for disability and Manual Muscles Testing for strength of the lower trapezius. Results concluded that the strengthening of the lower trapezius muscle along with isometric neck exercises reduced pain and disability and increase lower trapezius strength in subjects with chronic neck pain.

- **Petersen SM, et al., (2016)** conducted a cross sectional study to examine the scapulothoracic muscle strength (LT, MT and SA) in individuals with neck pain. A total 22 participants with chronic neck pain in which 17 were asymptomatic individuals and NDI and manual muscle testing for Lower Trapezius (LT), Middle Trapezius (MT) and Serratus Anterior (SA) are used as outcome measures. Results concluded that there were significant within subject differences were found between sides for the LT and MT while significant between groups differences were identified for all three muscles tested.

- **Petersen SM, Wyatt SN, (2011)** conducted a comparative study to examine the lower trapezius muscle strength in individuals with unilateral neck pain. 25 individuals were participated in this study and completed Northwick Park Neck Pain Questionnaire (NPQ) and handheld dynamometer were used to measure the neck pain and associated disability and muscle strength bilaterally. Through this study exhibit significantly less trapezius strength on the side of neck pain compared to the contralateral side.

- **Su-Rim Kim, et al., (2016)** conducted a study to investigate the correlations among scapular asymmetry, neck pain, and neck disability index in young women with slight neck pain. A total of 60 female students were participated and lateral scapular slide test (LSST), VAS and NDI scales were used to analyze the scapular asymmetry and pain. In conclusion, there were an imbalance of muscles indicate scapular asymmetry and were related to pain in the neck.

CHAPTER – III

MATERIALS AND METHODS

3.1 MATERIALS:

1. Therabands
2. Goniometer
3. Scale (15cm)
4. Armed chair
5. NDI questionnaire

3.2 STUDY DESIGN:

A QUASI experimental study design (pretest and posttest design).

3.3 STUDY SETTING:

The study was conducted in the Orthopaedics department and Out-patient Department of Physical Medicine and Rehabilitation, P.S.G Hospital, Coimbatore.

3.4 HUMAN PARTICIPATION PROTECTION:

The study was reviewed and approved by Institutional Human Ethics Committee at PSG IMSR.

3.5 POPULATION / PARTICIPANTS:

30 patients with Mechanical neck pain were selected and 15 patients assigned to each groups.

Group A: Scapular Stabilization Exercises

Group B: Conventional physiotherapy

3.6 SAMPLING:

Convenience sampling

3.7 CRITERIA FOR SAMPLE SELECTION:

3.7.1 Inclusion criteria:

- Age: > 18 to 45 years
- Subjects with Mechanical neck pain
- Pain duration for atleast 3 months
- Neck pain reproduced at end ranges of active and passive motion
- Baseline NDI score of atleast 20% (10 points)
- Forward head posture (postural dysfunction)
- Positive Scapular Dyskinesia Test

3.7.2 Exclusion criteria:

- Neurological deficit
- Pain in scapular and thoracic region
- Any shoulder pathology/ trauma
- Previous history of cervical and thoracic and shoulder surgery.
- Whiplash injury
- Clinical prediction rule positive:
    - -Upper Limb Tension Test
    - -Distraction Test
    - -Spurling's Test

3.8 STUDY DURATION:

Total duration of 8 months was adopted for this study

3.9 TREATMENT DURATION:

30 minutes per session

2 sessions per day (10 repetitions)

3days/week for 4 weeks

3.10 INTERVENTION:

Scapular stabilization exercises included specific exercises on the basis of muscles affecting the scapula orientation related to neck pain. The exercise program aimed to create a neutral spine and activate the neuromuscular pattern in the serratus anterior, trapezius and rhomboids. The patient was instructed to check and correct their posture by themselves. The patients began exercising with mild or medium tension and progression carried out when they performed 15 repetitions without fatigue and pain[(1)].

Weekly progression of exercises

	WEEK 1	**WEEK 2**	**WEEK 3**	**WEEK 4**
SCAPULAR STABILIZATION EXERCISES	Begin using yellow or red elastic band 1 set of 10 repetitions 2 sessions / day	With same color elastic band 1 set of 15 repetitions 2 sessions / day	Progress to next color elastic band 1 set of 10 repetitions 2 sessions / day	With same progress color elastic band 1 set of 15 repetitions 2 sessions / day

3.11 INSTRUMENT & TOOL FOR DATA COLLECTION:

Visual Analog Scale (VAS) to measure pain intensity

Neck Disability Index (NDI) to measure Neck Disability (functional status)

3.12 TECHNIQUE OF DATA COLLECTION:

Participants with mechanical neck pain were selected for the study based on an inclusion criteria and informed consent was obtained from patients prior to conduct the study. Initial assessment was taken on the first day of intervention by using outcome measures for neck pain (VAS) and disability index (NDI) were assessed before and after the study. The Intervention was given to experimental group for 4 weeks. Final assessment was taken after the 4 weeks of Scapular Stabilization Exercises using the same outcome measures. Comparison of pretest and post test values of Scapular Stabilization Exercises and Conventional physiotherapy within the group and between the groups was done finally.

3.13 TECHNIQUE OF DATA ANALYSIS &INTERPRETATION:

Data collected from subjects were analyzed using paired ‘ t ’ test to measure changes between pretest and posttest values of outcome measures within the group. Independent ‘ t ’ test was used to measure changes between the groups.

Paired ‘t’ test

$$SD = \sqrt{\frac{\sum (d - \overline{d})^2}{n-1}}$$

$$t = \frac{\overline{d}\sqrt{n}}{SD}$$

$\overline{d}$ = Calculated Mean Difference of pretest and posttest values

SD = Standard Deviation

n = Number of samples

d = Difference between pretest and posttest values

Independent ‘t’ test:

$$\mathbf{t} = \frac{|\overline{\mathbf{x}}_1 - \overline{\mathbf{x}}_2|}{SD\sqrt{\frac{1}{\mathbf{n}_1} + \frac{1}{\mathbf{n}_2}}}$$

Where,

$$\mathbf{SD} = \sqrt{\frac{(\mathbf{n}_1 - 1)\mathbf{SD}_1^2 + (\mathbf{n}_2 - 1)\mathbf{SD}_2^2}{\left(\mathbf{n}_1 + \mathbf{n}_2\right) - 2}}$$

$\overline{X_1}$ = Mean difference in Group A

$\overline{X_2}$ = Mean difference in Group B

SD = Combined standard deviation of Group A and Group B

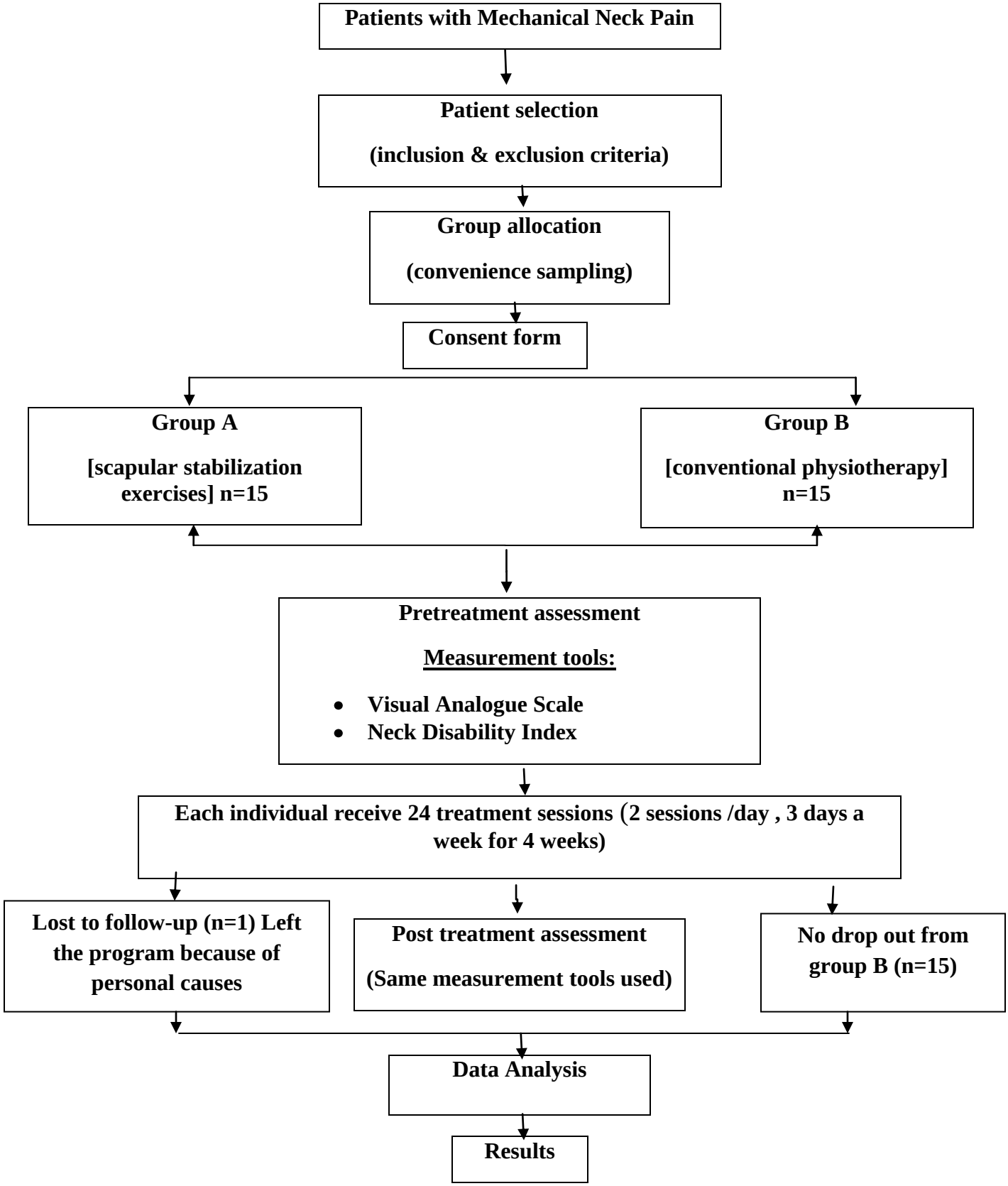
n1 = Number of patients in Group A

n2 = Number of patients in Group B

SD1 = Standard Deviation of Group A

SD2 = Standard Deviation of Group B

SCHEMATIC REPRESENTATION OF PARTICIPANTS



CHAPTER – IV

DATA ANALAYSIS AND INTERPRETATION

Data analysis is the systemic organization and synthesis of research data and testing of research hypothesis using these data. Interpretation is the process of making sense of the results of a study and examining the implication (Polit & Belt, 2004). The pretest and posttest values for Groups A & B were obtained before and after intervention. The improvement in Pain was assessed using Visual Analogue Scale (VAS) and the improvement in Functional status was assessed using Neck Disability Index (NDI). The mean, standard deviation and Paired " t " test values were used to find out whether there was any significant difference between pretest and posttest values within the groups.

Independent "t" test is used to find the significant differences between the groups after intervention.

TABLE: 1

PRETEST AND POSTTEST VALUES OF VISUAL ANALOGUE SCALE (VAS) IN GROUP A (n=14)

S. NO.	PRETEST	POSTTEST
1.	80	44
2.	71	50
3.	73	59
4.	90	75
5.	74	65
6.	60	47
7.	79	60
8.	86	70
9.	83	68
10.	75	60
11.	65	48
12.	82	53
13.	68	49
14.	75	57

TABLE: 2

PRETEST AND POSTTEST VALUES OF VISUAL ANALOGUE SCALE (VAS) IN GROUP B (n=15)

S. NO.	PRETEST	POSTTEST
1.	83	59
2.	69	48
3.	91	67
4.	84	59
5.	83	60
6.	76	49
7.	67	44
8.	72	50
9.	76	44
10.	85	62
11.	74	40
12.	60	30
13.	73	47
14.	82	68
15.	65	42

TABLE: 3

Mean & Standard Deviation of VAS in patients with Mechanical Neck Pain

Groups	Mean	Mean Difference	Standard Deviation	"t" Value	"p" Value
Group A					
Pretest	75.7	18.2	6.8	9.9	P < 0.001
Posttest	57.5				
Group B					
Pretest	76.0	24.7	4.8	19.9	P < 0.001
Posttest	51.2				

Based on Table 3, the mean difference of group A was found to be 18.2, Standard deviation was 6.8, the 't' value using the paired 't' test was 9.9 which was greater than the table value 4.2 at P<0.001. In Group B the mean difference was 24.7, standard deviation was 4.8, the 't' value using the paired 't' test was 19.9 which was greater than the table value 4.1 at P<0.001. This shows there is a significant reduction in pain for VAS in both groups.

GRAPH: 1

COMPARISON BETWEEN GROUP A & GROUP B FOR VISUAL ANALOGUE SCALE (VAS)

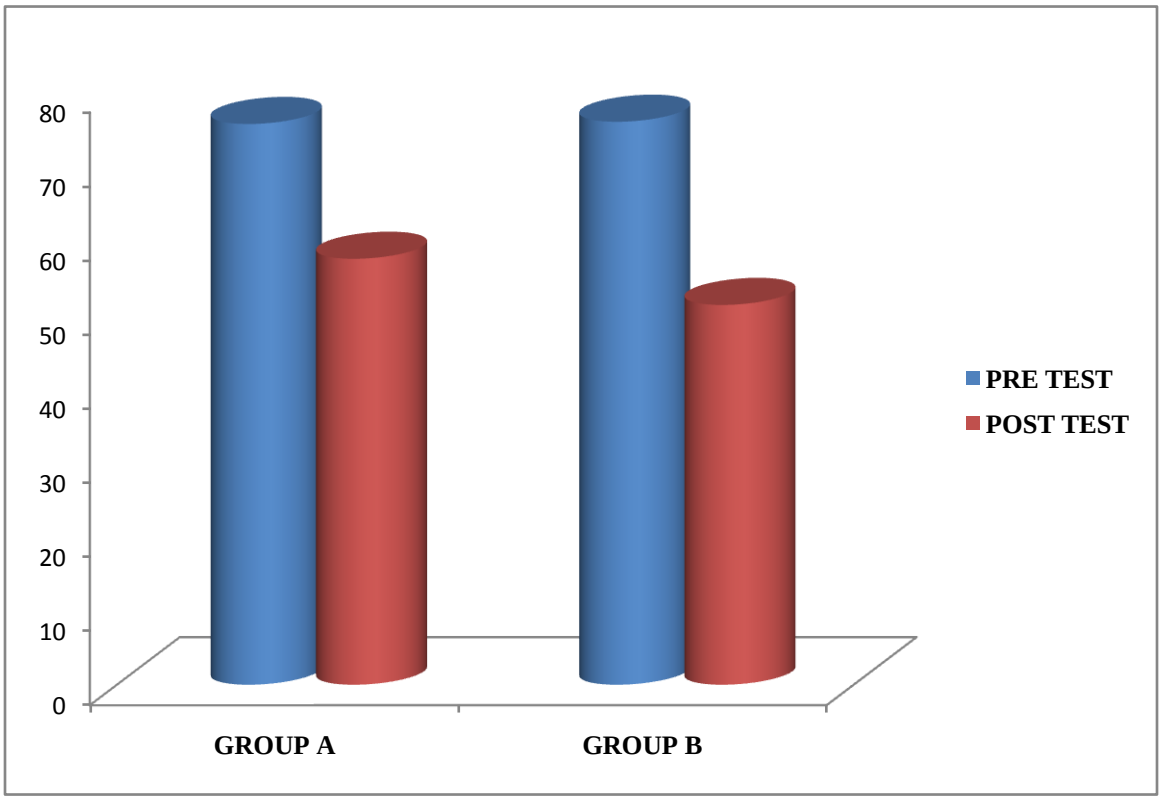


TABLE: 4

PRETEST AND POSTTEST VALUES OF NECK DISABILITY INDEX (NDI) IN GROUP A

(n= 14)

S.NO.	PRETEST	POSTTEST
1.	36	10
2.	20	4
3.	26	4
4.	42	24
5.	40	14
6.	30	8
7.	44	16
8.	46	28
9.	44	16
10.	42	18
11.	28	8
12.	36	10
13.	28	10
14.	30	10

TABLE: 5

PRETEST AND POSTTEST VALUES OF NECK DISABILITY INDEX (NDI) IN GROUP B

(n= 15)

S.NO.	PRETEST	POSTTEST
1.	48	36
2.	46	28
3.	30	16
4.	32	18
5.	28	10
6.	46	30
7.	48	36
8.	36	24
9.	32	24
10.	40	28
11.	46	32
12.	48	32
13.	28	10
14.	44	28
15.	40	28

TABLE: 6

Mean, Standard Deviation of NDI in patients with Mechanical Neck Pain

Groups	Mean	Mean Difference	Standard Deviation	"t" Value	"p" Value
Group A					
Pre test	35.1	22.2	4.0	20.5	P < 0.001
Post test	12.8				
Group B					
Pre test	39.4	14.1	2.8	19.0	P < 0.001
Post test	25.3				

Based on Table 6, the mean difference of group A was found to be 22.2, Standard deviation was 4.0, the 't' value using the paired 't' test was 20.5 which was greater than the table value 4.2 at P<0.001. In Group B the mean difference was 14.1, standard deviation was 2.8, the 't' value using the paired test was 19.0 which was greater than the table value 4.1 at P<0.001. This shows there is a significant improvement in functional activities for NDI in both groups.

GRAPH: 2

COMPARISON BETWEEN GROUP A & GROUP B FOR NECK DISABILIY INDEX (NDI)

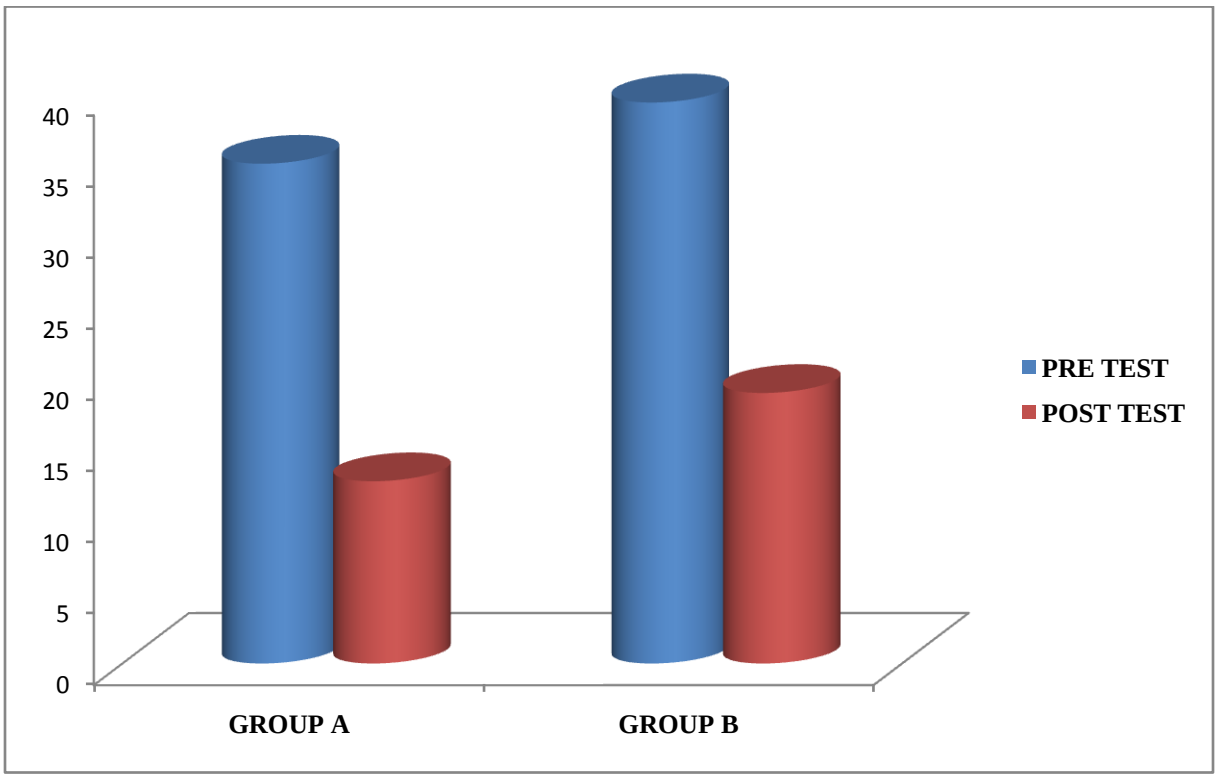


TABLE: 7

COMPARISON BETWEEN PATIENTS WITH SCAPULAR STABILIZATION EXERCISES AND CONVENTIONAL PHYSIOTHERAPY

OUTCOME MEASURES	MEAN DIFFERENCE	STANDARD DEVIATION	t value	P value
VAS	6.2	9.5	1.6	NS*
NDI	12.4	8.3	4.3	P < 0.001

***NS =** Not Significant

The Independent 't' test was performed between Group A and Group B to analyze the significance of Scapular Stabilization Exercises on pain reduction and functional disability in patients with Mechanical Neck Pain.

The **Visual Analogue Scale (VAS)**, between the group were calculated using independent 't' test & the obtained 't' value is 1.6 which was lesser than that of table value 3.6 at P>0.001.

The **Neck Disability Index (NDI)**, between the group were calculated using independent 't' test & the obtained 't' value is 4.3 which was greater than that of table value 3.6 at P<0.001.

Therefore the results of this statistical analysis showed that the Group A is effective on improving the functional status (NDI) compared to Group B. And there is no significant difference between groups on pain (VAS).

CHAPTER V

RESULTS AND DISCUSSION

The aim of the study was to determine the efficacy of Scapular Stabilization Exercises on pain and functional status in patients with Mechanical Neck Pain. Statistical analysis for the present study was done using IBM SPSS version 20.0.

A total of 30 patients diagnosed with mechanical neck pain in the age group of > 18 – 45 years participated in this study. The participants who satisfied the selection criteria were conveniently assigned into two groups. Baseline measurements were taken using the Visual Analogue Score (VAS) and Neck Disability Index (NDI) for both groups. One group received Scapular stabilization exercises for 4 weeks and the other group received Conventional physiotherapy separately for 4 weeks. At the end of 4 weeks, patients again underwent the evaluation using the same outcome measures. No patients with similar impairments and similar functional limitations. Drop out were there in Scapular stabilization exercises group because of patient personal reasons.

The data of an experimental group shows a significant in improving the **functional status (NDI)** ($p<0.001$). The functional status was significantly improved from 35.1 to 12.8. The functional status in the experimental group significantly improved after scapular stabilization exercises training compared to the control group (Table no. 7). The NDI score showed a significant improvement in the experimental group compared to the control group. The mean pre-test score was 35.1 in the Scapular Stabilization Exercises group and 39.4 in the control group. The mean post-test score of each group was 12.8 and 25.3, respectively (Table no. 6).

The data of an experimental group shows significance in **pain level (VAS)** within a group analysis from 75.7 to 57.5. On comparing between the groups VAS score is not significant in pain level compared to the control group (Table no. 7). The mean pre-test score was 75.7 in the scapular stabilization exercises group and 76 in the control group. The mean post-test score of each group was 57.5 and 51.2 respectively (Table no. 3).

The following findings were observed in the present study: (i) Scapular Stabilization Exercises with Mechanical Neck Pain decreased pain intensity within the group; (ii) Scapular Stabilization Exercises were more effective in improving functional status in MNP compared to conventional therapy. Therefore, recent studies focused on the effects of different exercise interventions for the management of patients with MNP. Movement pattern correction is an important part of muscle-recruiting strategies in rehabilitation. Recovering the normal activation of the serratus anterior and trapezius muscles is essential for neck and shoulder disorder rehabilitation[12]. **Pranjal Gogoi (2015)** showed the effectiveness of strength and endurance training in cervical for decreasing pain and disability in mechanical neck pain. This study used VAS and NDI to estimate the recovery of pain and activity limitation according to disability. Mechanical neck pain is associated with many different conditions such as excessive workload, postural disorders, psychological state, poor postures, carrying laptop bag as side pack [14] and structural disorders [2].

Previous studies have reported that weakened muscles cause disruptions in normal movement patterns and motor control, and that these muscles are replaced by other muscles to perform similar movements. **Kibler** reported that a decrease in the stabilizing musculature causes large scapular asymmetry[15]. A study by **Su-Rim-Kim et al.,** reported that the muscles attached to the scapula are connected to other surrounding bones and decrease in stability due to inappropriate action of these muscles causes pain in surrounding body parts or bad postures. The authors suggested that losing the balance among these muscles causes inappropriate muscle action and decreases the stabilizing musculature[6]. **Helgadottir et al.** reported that a deficit in the activity and the recruitment of the serratus anterior affects scapular stability and scapular orientation[10]. A study by **Wegner et al.,** reported that patients with forward head posture showed more anterior-tilted shoulder joints, lesser serratus anterior muscle activity, and greater scapular internal rotation during shoulder flexion compared to normal subjects[16]. **Thigpen, et al.,** reported that patients with forward head posture had a significantly decreased activity in the serratus anterior muscle when performing overhead shoulder flexion tasks. The authors suggested that the change in the serratus anterior muscle activity is one of the reasons for biomechanical changes in the scapula[17].

Similarly, a study revealed by **Petersen and Wyatt** says that individuals with unilateral neck pain on compared to the contralateral side exhibited significantly less lower trapezius strength on the side of neck pain[18]. **Dabholkar, et al.,** revealed that there were evident in the subjects with unilateral neck pain present with scapular muscular strength deficits [19]. A study by **Mottram SL, et al.,** highlights the influence the position of the scapula in terms of posterior tilting and upward rotation in the rehabilitation of control of the scapula and in understanding the biomechanics involved in a scapular orientation exercise [20]. Consequently, through this study scapular stabilization exercises might be superior in treating Mechanical Neck Pain patients for improvement in functional status.

5.1 LIMITATIONS OF THE STUDY:

- There was a lack of long term follow up of patients to find out the carry over effects of the intervention.
- The study measures only pain and functional status.
- The study is done with small samples.

5.2 SUGGESTIONS FOR FUTURE RESEARCH:

- The Further studies can be done in large samples because if more the sample size used, greater would be the significance.
- The future studies can be added with other outcome measures.
- The study can be done with age group of below 18 years.
- Long term follow-up can be done to determine the effect of intervention.

CHAPTER - VI

SUMMARY AND CONCLUSION

This study was conducted to determine the efficacy of scapular stabilization exercises in reducing pain and improving the functional status in patients with Mechanical Neck Pain.

Thus the statistical analysis of data concluded that

"Scapular Stabilization Exercises shows statistically significant improvement in functional status compared to Conventional physiotherapy, whereas there was statistically no significant difference between Scapular Stabilization Exercises and Conventional physiotherapy in pain".

BIBLIOGRAPHY

1. **S.T.Celenay et al.,** Cervical and scapulothoracic stabilization exercises with and without connective tissue massage for chronic mechanical neck pain: A prospective, randomised controlled trial. Manual Therapy 21 (2016) 144-150.

2. **Pranjal Gogoi,** Effect of cervical endurance training programme in mechanical neck pain. Int. J Physiother. Oct. 2015; Vol 2 (5) 724-730.

3. **Steven P. Cohen, MD.** Epidemiology, Diagnosis and Treatment of Neck pain. Symposium on pain medicine. February 2015; 90(2):284-299.

4. **Richa Mahajan, et al.,** Comparative Effectiveness of Muscle Energy Technique and Static Stretching for Treatment of Subacute Mechanical Neck Pain. International Journal of Health and Rehabilitation Sciences. July 2012; Volume 1 Number.

5. **Childs JD, Cleland JA, Elliott JM, Teyhen DS, Wainner RS, Whitman JM, et al.,** Neck pain: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association Journal of Orthopedic and Sports Physical Therapy. J Orthop Sports Phys. Ther. 2008; 38(9): A1-A34.

6. **Su-Rim Kim et al.,** Correlation among scapular asymmetry, neck pain, and neck disability index (NDI) in young women with slight neck pain. J. Phys. Ther. Sci. 28 (5): 1508–1510, 2016.

7. **Dabholkar Ajit S, Yardi Sujata S.** Scapular Muscle Strength in Mechanical Neck Pain Patients. IJSRE Volume 3 Issue 4 April 2015: Num. 3260-3264.

8. **Chaitow L**. Muscle energy techniques. 3rd ed. Edinburgh: Churchill Livingstone; 2006:1-187.

9. **Dr. Daniel Leonard**. Neck, shoulder, or elbow pain? Look no further than the scapular muscles on April 2015 in Blog neck pain Rehabilitation shoulder pain, Available from: http://cospineandjoint.com/2015/04/scapular-muscles/

10. **Helgadottir. H-** Altered activity of the serratus anterior during unilateral arm elevation in patients with cervical disorders. Journal of Electromyography and Kinesiology 21 (2011) 947-953.

11. **Barbara Cagnie et al.,** The Relevance of Scapular Dysfunction in Neck Pain: A Brief Commentary. Journal of orthopaedic & sports physical therapy | volume 44 | number 6 | June 2014.

12. **Boyoung Im, et al.,** Effects of scapular stabilization exercise on neck posture and muscle activation in individuals with neck pain and forward head posture. J. Phys. Ther. Sci. 28: 951–955, 2016.

13. **Kisner C, Colby LA.** Therapeutic exercise: foundations and techniques. 5th edition. Philadelphia: F.A Davis company; 2002: 451 – 452.

14. **Siddhartha Sen, Ajita D Singh (2017)** Changes in head & shoulder posture of collegiate students carrying laptop bag as side pack. Int J Physiother Res 2017, Vol 5(1):1824-28.

15. **Kibler WB:** Role of the scapula in the overhead throwing motion. Contemp Orthop, 1991, 22: 525–532.

16. **Wegner et al.,** The effect of a scapular postural correction strategy on trapezius activity in patients with neck pain. Manual Therapy (2010).

17. **Thigpen CA et al.,** Head and shoulder posture affet scapular mechanics and muscle activity in overhead tasks. Journal of Electromyography and Kinesiology, (2010).

18. **Shannon M. Petersen, Sarah N. Wyatt.** Lower Trapezius Muscle Strength in Individuals With Unilateral Neck Pain. Journal of orthopaedic; April 2011| volume 41| number 4| 260-265.
19. **Dabholkar et al.,** Scapular muscle strength in computer users with unilateral neck pain. 2015.

20. **Mottram SL, et al.** Motion analysis study of a scapular orientation exercise and subjects' ability to learn the exercise. Manual Therapy (2007).

21. **Christensen S.W. et al.,** Altered pain sensitivity and axioscapular muscle activity in neck pain patients compared with healthy controls. European Journal of Pain (2017).

22. **Christoffer H. Andersen et al.,** Effect of Scapular Function Training on Chronic Pain in the Neck/Shoulder Region: A Randomized Controlled Trial**.** J Occup Rehabil (2014) 24:316–324.

23. **Guilherme Trivellato Andrade et al.,** Influence of Scapular Position on Cervical Rotation Range of Motion. Journal of orthopaedic& sports physical therapy | volume 38 | number 11 | november 2008.

24. **Joshua A. Cleland et al.,** Interrater Reliability of the History and Physical examination in patients with Mechanical Neck Pain. Arch Phys Med Rehabil Vol 87, October 2006; 1388-1395.

25. **Kamalakannan .M, Anita .A** – Effectiveness of Lower Trapezius Exercise in pain and disability among Chronic Neck Pain subjects. International Journal of Therapies and Rehabilitation Research 2015; 4(5): 283-286.

ANNEXURE I

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee
Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

To
Ms Priya S
I Year MPT
Guide/s: Prof. R Mahesh / Mr B Nagaraj
PSG College of Physiotherapy
Coimbatore

Ref: Project No.17/119

Date: July 21, 2017

Dear Ms Priya,

Institutional Human Ethics Committee, PSG IMS&R reviewed and discussed your application dated 03.04.2017 to conduct the research study entitled "*Efficacy of scapular stabilization exercises in patients with mechanical neck pain*" during the IHEC review meeting held on 21.04.2017.

The following documents were reviewed and approved:

1. Project Submission form
2. Study protocol (Version 1 dated 03.04.2017)
3. Informed consent forms (Version 2 dated 18.07.2017)
4. Data collection tool (Version 2 dated 18.07.2017)
5. Permission letter from concerned Heads of Department
6. Current CVs of Principal investigator, Co-investigators
7. Budget

The following members of the Institutional Human Ethics Committee (IHEC) were present at the meeting held on 21.04.2017 at College Council Room, PSG IMS & R between 2.30 pm and 4.30 pm:

Sl. No.	Name of the Member of IHEC	Qualification	Area of Expertise	Gender	Affiliation to the Institution Yes/No	Present at the meeting Yes/No
1	Mrs Y Ashraf	MPT	Physiotherapy	Female	Yes	Yes
2	Dr. S. Bhuvaneshwari (Member-Secretary, IHEC)	MD	Clinical Pharmacology	Female	Yes	Yes
3	Mr Gowpathy Velappan	BA., BL	Legal Advisor	Male	No	Yes
4	Dr A Jayavardhana	MD	Clinician (Paediatrics)	Male	Yes	Yes
5	Mr P Karuppuchamy	M Phil in PSW	Social Scientist	Male	Yes	Yes
6	Dr G Malarvizhi	M Sc, Ph D	Nursing	Female	Yes	No
7	Mr. R. Nandakumar (Chairperson, IHEC)	BA., BL	Legal Expert	Male	No	Yes

8	Dr. Parag K Shah	DNB	Clinician (Ophthalmology)	Male	No	Yes
9	Mrs P Rama	M Pharm	Non-Medical (Pharmacy)	Female	Yes	No
10	Dr. Seetha Panicker	MD	Clinician (Obstetrics & Gynaecology)	Female	Yes	No
11	Dr. S. Shanthakumari	MD	Pathology	Female	Yes	Yes
12	Dr. Sudha Ramalingam (Alternate Member-Secretary, IHEC)	MD	Public Health, Epidemiology, Genetics	Female	Yes	Yes
13	Mrs. Swasthika Soundararaj	MBA	Lay person	Female	No	Yes
14	Dr. D. Vijaya	M Sc, Ph D	Basic Medical Sciences (Biochemistry)	Female	Yes	No

The study is approved in its presented form. The decision was arrived at through consensus. Neither PI nor any of proposed study team members were present during the decision making of the IHEC. The IHEC functions in accordance with the ICH-GCP/ICMR/Schedule Y guidelines. The approval is valid until one year from the date of sanction. You may make a written request for renewal / extension of the validity, along with the submission of status report as decided by the IHEC.

Following points must be noted:

1. IHEC should be informed of the date of initiation of the study
2. Status report of the study should be submitted to the IHEC every 12 months
3. PI and other investigators should co-operate fully with IHEC, who will monitor the trial from time to time
4. At the time of PI's retirement/intention to leave the institute, study responsibility should be transferred to a colleague after obtaining clearance from HOD, Status report, including accounts details should be submitted to IHEC and extramural sponsors
5. In case of any new information or any SAE, which could affect any study, must be informed to IHEC and sponsors. The PI should report SAEs occurred for IHEC approved studies within 7 days of the occurrence of the SAE. If the SAE is 'Death', the IHEC Secretariat will receive the SAE reporting form within 24 hours of the occurrence
6. In the event of any protocol amendments, IHEC must be informed and the amendments should be highlighted in clear terms as follows:
    a. The exact alteration/amendment should be specified and indicated where the amendment occurred in the original project. (Page no. Clause no. etc.)
    b. Alteration in the budgetary status should be clearly indicated and the revised budget form should be submitted
    c. If the amendments require a change in the consent form, the copy of revised Consent Form should be submitted to Ethics Committee for approval
    d. If the amendment demands a re-look at the toxicity or side effects to patients, the same should be documented
    e. If there are any amendments in the trial design, these must be incorporated in the protocol, and other study documents. These revised documents should be submitted for

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee

Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

approval of the IHEC and only then can they be implemented
f. Any deviation-Violation/waiver in the protocol must be informed to the IHEC within the stipulated period for review

7. Final report along with summary of findings and presentations/publications if any on closure of the study should be submitted to IHEC

Thanking You,

Yours Sincerely,

SECRETARY
PSG IMS&R
COIMBATORE-641004.
INSTITUTIONAL HUMAN ETHICS COMMITTEE

Dr S Bhuvaneshwari
Member - Secretary
Institutional Human Ethics Committee

ANNEXURE II

ASSESSMENT FORM

Subject number:

Demographic data:

Name: IP/OP Number:

Age: Contact Number:

Sex: Date of Admission:

Occupation: Date of Assessment:

Address:

Subjective Assessment:

Chief complaints:

Present medical history:

Past medical history:

Personal history:

Occupational history (Lifestyle):

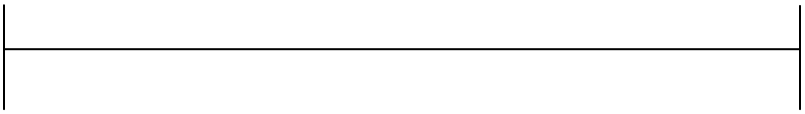
Associated Problems:

Pain history:

a) Pain:
   - Site:
   - Side:
   - Onset:
   - Duration:
   - Type:
   - Aggravating factors:
   - Relieving factors:

b) Grading of pain:

VISUAL ANALOGUE SCALE (VAS)



Objective Assessment:

On Observation:

- ❖ Built:
- ❖ Posture:
- ❖ Muscle wasting:
- ❖ Deformity:
- ❖ External appliances:
- ❖ Tropical changes:
- ❖ Attitude of limbs:

On Palpation:

- ❖ Tenderness:
- ❖ Muscle spasm:
- ❖ Warmth:
- ❖ Swelling:
- ❖ Myofascial nodules:

On Examination:

Motor Examination:

Range of motion (Goniometer)

MOVEMENTS	**Degrees**	
Cervical Flexion		
Cervical Extension		
Cervical lateral flexion	Right:	Left:
Cervical rotation	Right:	Left:
SHOULDER	**Right**	**Left**
Flexion		
Extension		
Abduction		
Adduction		
Medial rotation		
Lateral rotation		

ELBOW	Right	Left
Flexion		
Extension		
WRIST	**Right**	**Left**
Flexion		
Extension		

Muscle power: (Muscle Testing)

Scapular muscles:

MUSCLE GROUP	POWER	
Cervical Flexors		
Cervical Extensors		
Cervical lateral flexors	Right:	Left:
Cervical rotators	Right:	Left:
SHOULDER	**Right**	**Left**
Flexors		
Extensors		
Abductors		

Adductors		
Medial rotators		
Lateral rotators		
ELBOW	**Right**	**Left**
Flexors		
Extensors		
WRIST	**Right**	**Left**
Flexors		
Extensors		

Muscle girth: (Inch Tape)

AREA	RIGHT(cm's)	LEFT(cm's)
Arm		
Forearm		

Sensory Examination:

- Superficial sensation:
- Deep sensation:

Reflex: (Wexler's grading)

REFLEX	RIGHT	LEFT
Biceps jerk		
Triceps jerk		

Special tests:

- Spurling test / foraminal compression test
- Distraction test
- Upper-Limb Tension Test 1
- Ipsilateral cervical rotation<60°
- Adson test
- Wallenberg test / vertebral artery test

Functional assessment:

- Neck Disability Index

PROVISIONAL DIAGNOSIS:

PHYSIOTHERAPY MANAGEMENT:

OBJECTIVES:

TREATMENT PLAN:

A) Short term goal:

B) Long term goal:

TREATMENT GIVEN:

Date: Therapist Signature:

FOLLOW UP PROFORMA

Name:

Age:

Sex:

IP/OP Number:

Date of Assessment:

Date of follow up:

Specific complaints:

Treatment plan:

Results	Pre-Test	Post-Test
Visual Analogue Scale		
Neck Disability Index		

Date: Therapist Signature:

ANNEXURE III

PSG Institute of Medical Science and Research, Coimbatore
Institutional Human Ethics Committee
INFORMED CONSENT FORMAT FOR RESEARCH PROJECTS

I Priya.S, am carrying out a study on the topic: **"Efficacy of Scapular Stabilization Exercises in patients with Mechanical Neck Pain"**, as part of my research project being carried out under the aegis of the Department of Orthopaedics & Physical Medicine and Rehabilitation.

My research guide is: Prof. R. Mahesh, MPT(Cardio Respiratory).

The justification for this study is:

Mechanical Neck Pain is an abnormal physical and psychosocial contribution to cervical spine that causes pain, muscles weakness and scapular dysfunction. Scapular Stabilization Exercises will reduce the pain, strengthen the weakened scapular muscles and also improves the neck functions.

The objectives of this study are:

To determine the efficacy of scapular stabilization exercises in mechanical neck pain patients in reducing pain and in improving the functional status.

Sample size: 30

Study volunteers / participants are Mechanical Neck Pain patients, age group of > **18 – 45** years.

Location: Department of Orthopaedics and Department of PMR, PSG Hospitals.

We request you to kindly cooperate with us in this study. We propose collect background information and other relevant details related to this study. We will be carrying out:

Initial interview: 45 minutes.

Final interview: 15 minutes.

Data collected will be stored for a period of **5** years. **We will not** use the data as part of another study.

If **Photography** taken, purpose: **Yes,** without revealing the identity of yours we want to publish it in the project book, conferences and journals.

Benefits from this study:

- Pain will be reduced
- Improves scapular muscles strength

- Neck functions will be improved
- Postural correction

Risks involved by participating in this study: There are minimal risks or discomforts will be experienced during this study. The discomforts may be exercise induced pain or stretch pain. In case of any discomfort Cryotherapy will be given.

How the **results** will be used:

- Peer-reviewed scientific journals
- Conference presentation
- Internal report

The data collected during the study will be used without revealing your identity. Your identity will be confidential even if the results of the study are published.

If you are uncomfortable in answering any of our questions during the course of the interview / biological sample collection, **you have the right to withdraw from the interview / study at anytime.** You have the freedom to withdraw from the study at any point of time. Kindly be assured that your refusal to participate or withdrawal at any stage, if you so decide, will not result in any form of compromise or discrimination in the services offered nor would it attract any penalty. You will continue to have access to the regular services offered to a patient. You will **NOT** be paid any remuneration for the time you spend with us for this interview / study. The information provided by you will be kept in strict confidence. Under no circumstances shall we reveal the identity of the respondent or their families to anyone. The information that we collect shall be used for approved research purposes only. You will be informed about any significant new findings - including adverse events, if any, – whether directly related to you or to other participants of this study, developed during the course of this research which may relate to your willingness to continue participation.

Consent: The above information regarding the study, has been read by me/ read to me, and has been explained to me by the investigator/s. Having understood the same, I hereby give my consent to them to interview me. I am affixing my signature / left thumb impression to indicate my consent and willingness to participate in this study (i.e., willingly abide by the project requirements).

Signature / Left thumb impression of the Study Volunteer / Legal Representative:

Signature of the Interviewer with date: Witness:

Contact number of PI: 9578549080

Contact number of Ethics Committee Office: 0422 4345818

பூ. சா. கோ மருத்துவக் கல்லூரி மற்றும் ஆராய்ச்சி நிறுவனம், கோவை

மனித நெறிமுறைக் குழு

ஒப்புதல் படிவம்

தேதி:

செ. ப்ரியா, ஆகிய நான் பூ. சா. கோ மருத்துவக் கல்லூரியின் இயன்முறை மருத்துவத் துறையின் கீழ், **"முறையற்ற செயல்பாட்டினால் ஏற்படும் கழுத்து வலி நோயாளிகளுக்கு தோள்பட்டை தசைகள் வலுப்படுத்தும் உடற்பயிற்சியின் பலாபலனைக் காணும் ஆய்வு"** என்ற தலைப்பில் ஆய்வு மேற்கொள்ள உள்ளேன்.

என் ஆய்வு வழிகாட்டி: திரு. ரா. மகேஷ், முதல்வர், பூ.சா.கோ இயன்முறை மருத்துவக் கல்லூரி

ஆய்வு மேற்கொள்வதற்கான அடிப்படை:

முறையற்ற செயல்பாட்டினால் ஏற்படும் கழுத்துவலியினால் கழுத்துப்பகுதியில் வேறுபாடுகள் ஏற்படுகிறது. இதனால் கழுத்து முதுகெலும்பு மற்றும் தோள்பட்டை இயக்க நிலை மற்றும் செயல்திறன் மாற்றங்கள் ஏற்படுகிறது. இதன் மூலமாக கழுத்து பகுதியில் வலி ஏற்படுகிறது. அது மட்டுமின்றி தோள்பட்டையின் தசைகள் மற்றும் தோள்பட்டையின் செயல்திறன் மாற்றங்கள் ஏற்படுகிறது. தோள்பட்டை உறுதிப்படுத்தும் உடற்பயிற்சியின் மூலமாக வலி குறைந்து, தோள்பட்டையில் உள்ள தசைகள் மற்றும் கழுத்துப்பகுதியில் ஏற்படும் செயல்திறன் அதிகரிக்கும் என எதிர்பார்க்கப்படுகிறது.

ஆய்வின் நோக்கம்:

எனது ஆய்வின் மூலமாக முறையற்ற செயல்பாட்டினால் ஏற்படும் கழுத்துவலியினால், தோள்பட்டையின் தசைகளை உறுதிப்படுத்தும் உடற்பயிற்சியை அளித்து கழுத்தின் வலியை குறைத்து, கழுத்தின் செயல்திறனை கண்டறிதல்.

ஆய்வில் பங்கு பெறும் நபர்களின் எண்ணிக்கை: 30

ஆய்வில் பங்கு பெறுவோர் மற்றும் வயது: >18 - 45 வயதுக்குட்ப்பட்ட, முறையற்ற செயல்பாட்டினால் ஏற்படும் கழுத்து வலி நோயாளிகள்.

ஆய்வு மேற்கொள்ளும் இடம்: எலும்பு மற்றும் மூட்டு சிகிச்சைப் பிரிவு மற்றும் புனர்வாழ்வு மருத்துவத் துறைகள், பூ.சா.கோ. மருத்துவமனை, கோயம்புத்தூர்.

இந்த ஆய்வில் எங்களுடன் ஒத்துழைக்குமாறு கேட்டுக்கொள்கிறோம். நாங்கள் சில தகவல்களை இந்த ஆய்விற்காக சேகரிக்க உள்ளோம்.

ஆய்வு செய்யப்படும் முறை:

இந்த ஆய்வின் மொத்த கால அளவு 9 மாதங்கள்.

பின்னர் கழுத்து வலி தோள்பட்டை தசைகளின் வலு மற்றும் கழுத்தின் அன்றாட செயல்திறன் ஆகியவை மதிப்பிடப்படும். பின்னர் தோள்பட்டை தசைகள் வலுப்படுத்தும் உடற்பயிற்சியின் மூலம் முறையற்ற செயல்பாட்டினால் ஏற்படும் கழுத்து வலிக்கு 30 நிமிடம் வீதம் வாரம் 3 நாட்களுக்கு 4 வாரத்திற்கு சிகிச்சை அளிக்கப்படும். 4 வார முடிவில் எடுக்கப்படும் முடிவுகள் ஆரம்ப மதிப்பீட்டுடன் ஒப்பிடப்படும்.

முதன்மை நேர்காணல்: 45 நிமிடங்கள்

இந்த ஆய்வில் கிடைக்கும் தகவல்கள் **5 வருடங்கள்** பாதுகாக்கப்படும். இந்த தகவல்கள் வேறு ஆய்விற்குப் பயன்படுத்தப் பட மாட்டாது.

முடிவு நேர்காணல்: 15 நிமிடங்கள்

சுகாதாரக் கல்வி: அமர்வுகள்: ___ முறை ஒரு அமர்வுக்கான நேரம்: ___ நிமிடங்கள்

மருத்துவ பரிசோதனைகள்: உண்டு

இரத்த மாதிரி சேகரிப்பு: _____ மிலி _____ முறை **பொருந்தாது**

இரத்த மாதிரி எடுப்பது வழக்கமான சிகிச்சைக்காகவோ அல்லது இந்த ஆய்விற்காகவோ:
பொருந்தாது

இதனால் ஏற்படக் கூடிய அசௌகரியங்கள் / பக்க விளைவுகள்: இதனால் எந்த அசௌகரியமோ, பக்க விளைவுகளோ ஏற்படாது. **பொருந்தாது**

இரத்த மாதிரிகள் ஆய்விற்குப் பின் பாதுகாத்து வைக்கப்படுமா? ஆம் / இல்லை, அழிக்கப்படும்: **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் விற்கப்படுமா? ஆம் / இல்லை **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் வேறு நிறுவனத்துடன் பகிர்ந்து கொள்ளப்படுமா? ஆம் / இல்லை: **பொருந்தாது**

மருந்துகள் ஏதேனும் கொடுக்கப்படவிருந்தால் அவை பற்றிய விவரம் (கொடுக்கப்படும் காரணம், காலம், பக்க விளைவுகள், பயன்கள்): **பொருந்தாது**

மருந்துகள் கொடுக்கப்படுவது வழக்கமான சிகிச்சை முறையா?: ஆம் / இல்லை (இல்லை என்றால் கொடுக்கப்படும் காரணம்) **பொருந்தாது**

கொடுக்கப்படும் மருந்துகளுக்கு மாற்று உள்ளதா?: ஆம் / இல்லை (ஆம் என்றால் இந்த குறிப்பிட்ட மருந்து கொடுக்கப்படும் காரணம்) **பொருந்தாது**

ஆய்வில் பங்குபெறுவதால் ஏற்படும் பலன்கள்:

- கழுத்து வலி குறைதல்
- தோள்பட்டை தசைகள் வலுப்படுத்துதல்
- அன்றாட செயல்திறன் அதிகரித்தல்
- கழுத்தின் நிலைகோடல் திருத்தல்

ஆய்வினால் ஏற்படக் கூடிய அசௌகரியங்கள் / பக்க விளைவுகள்: இதனால் எந்த அசௌகரியமோ, பக்க விளைவுகளோ ஏற்படாது. தோள்பட்டை பயிற்சியின் போது ஏதேனும் வலி ஏற்பட்டால் அதற்கு **பனிக்கட்டி ஒத்தடம்** கொடுக்கப்படும்.

ஆய்வின் முடிவுகள் எந்த முறையில் பயன்படுத்தப்படும்?

- அகநிலை அறிக்கை
- பத்திரிக்கைகள்
- கலந்தாய்வு உணர்வு ஆற்றல்

இந்த ஆய்வின் கேள்விகளுக்கு பதிலளிப்பதில் உங்களுக்கு ஏதேனும் அசௌகரியங்கள் இருந்தால், எந்த நேரத்தில் வேண்டுமானாலும் ஆய்விலிருந்து விலகிக்கொள்ளும் உரிமை உங்களுக்கு உண்டு. ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சை முறையில் எந்த வித பாதிப்பும் இருக்காது என்று உங்களுக்கு உறுதியளிக்கிறோம். மருத்துவ மனையில் நோயாளிகளுக்கு அளிக்கப்படும் சேவைகளை நீங்கள் தொடர்ந்து பெறலாம். இந்த ஆய்வில் பங்கேற்க ஒப்புக்கொள்ளுவதால் வேறு எந்த விதமான கூடுதலான

பலனும் உங்களுக்குக் கிடைக்காது. நீங்கள் அளிக்கும் தகவல்கள் இரகசியமாக வைக்கப்படும். ஆய்வில் பங்கேற்பவர்கள் பற்றியோ அவர்கள் குடும்பத்தைப் பற்றியோ எந்தத் தகவலும் எக்காரணம் கொண்டும் வெளியிடப்படாது என்று உறுதியளிக்கிறோம். நீங்கள் அளிக்கும் தகவல்கள் அங்கீகரிக்கப்பட்ட ஆய்விற்கு மட்டுமே பயன்படுத்தப்படும். இந்த ஆய்வு நடைபெறும் காலத்தில் குறிப்பிடத்தகுந்த புதிய கண்டுபிடிப்புகள் அல்லது பக்க விளைவுகள் ஏதும் ஏற்பட்டால் உங்களுக்குத் தெரிவிக்கப்படும். இதனால் ஆய்வில் தொடர்ந்து பங்கு பெறுவது பற்றிய உங்கள் நிலைப்பாட்டை நீங்கள் தெரிவிக்க ஏதுவாகும்.

ஆய்வுக்குட்படுபவரின் ஒப்புதல்: இந்த ஆய்வைப் பற்றிய மேற்கூறிய தகவல்களை நான் படித்து அறிந்து கொண்டேன் / ஆய்வாளர் படிக்கக் கேட்டுத் தெரிந்து கொண்டேன். ஆய்வினைப் பற்றி நன்றாகப் புரிந்து கொண்டு இந்த ஆய்வில் பங்கு பெற ஒப்புக்கொள்கிறேன். இந்த ஆய்வில் பங்கேற்பதற்கான எனது ஒப்புதலை கீழே கையொப்பமிட்டு. கை ரேகை பதித்து நான் தெரிவித்துக் கொள்கிறேன்.

பங்கேற்பாளரின் பெயர், முகவரி:

பங்கேற்பாளரின் கையொப்பம் / கை ரேகை / சட்டப்பூர்வ பிரதிநிதியின் கையொப்பம்:

தேதி :

ஆய்வாளரின் கையொப்பம்:

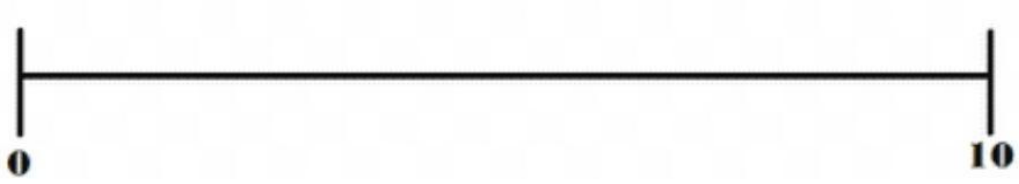
தேதி :

ஆய்வாளரின் தொலைபேசி எண்: 9578549080

மனித நெறிமுறைக் குழு அலுவலகத்தின் தொலைபேசி எண்: 0422-4345818

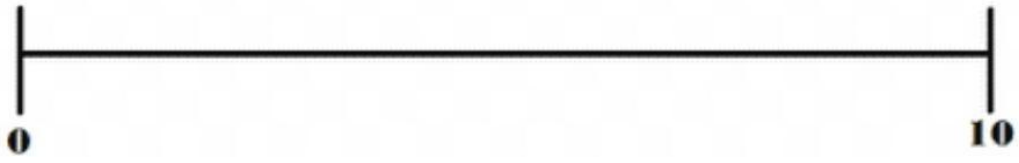
ANNEXURE IV

VISUAL ANALOGUE SCALE



No Pain **Worst possible pain**

காட்சி அனலாக் அளவில்



வலி இல்லை **மிகுதியான வலி**

NECK DISABILITY INDEX QUESTIONNAIRE

NECK PAIN DISABILITY INDEX QUESTIONNAIRE

PLEASE READ*: This questionnaire is designed to enable us to understand how much your neck pain has affected your ability to manage your everyday activities. Please answer each section by circling the ONE CHOICE that most applies to you. We realize that you may feel that more than one statement may relate to you, but *PLEASE JUST CIRCLE THE ONE. CHOICE WHICH MOST CLOSELY DESCRIBES YOUR PROBLEM RIGHT NOW.

SECTION 1 - Pain Intensity A I have no pain at the moment. B The pain is very mild at the moment. C The pain is moderate at the moment. D The pain is fairly severe at the moment. E The pain is very severe at the moment. F The pain is the worst imaginable at the moment.	***SECTION 6 - Concentration*** A I can concentrate fully when I want to with no difficulty. B I can concentrate fully when I want to with slight difficulty. C I have a fair degree of difficulty in concentrating when I want to. D I have a lot of difficulty in concentrating when I want to. E I have a great deal of difficulty in concentrating when I want to. F I cannot concentrate at all.
SECTION 2 -Personal Care (Washing, Dressing, etc.) A I can look after myself normally without causing extra pain. B I can look after myself normally, but it causes extra pain. C It is painful to look after myself and I am slow and careful. D I need some help, but manage most of my personal care. E I need help every day in most aspects of self care. F I do not get dressed, I wash with difficulty and stay in bed.	***SECTION 7 - Work*** A I can do as much work as I want to. B I can only do my usual work, but no more. C I can do most of my usual work, but no more. D I cannot do my usual work. E I can hardly do any work at all. F I cannot do any work at all.
SECTION 3 - Lifting A I can lift heavy weights without extra pain. B I can lift heavy weights, but it gives extra pain. C Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table. D Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned. E I can lift very light weights. F I cannot lift or carry anything at all.	***SECTION 8 - Driving*** A I can drive my car without any neck pain. B I can drive my car as long as I want with slight pain in my neck. C I can drive my car as long as I want with moderate pain in my neck. D I cannot drive my car as long as I want because of moderate pain in my neck. E I can hardly drive at all because of severe pain in my neck. F I cannot drive my car at all.
SECTION 4 - Reading A I can read as much as I want to with no pain in my neck. B I can read as much as I want to with slight pain in my neck. C I can read as much as I want to with moderate pain in my neck. D I cannot read as much as I want because of moderate pain in my neck. E I cannot read as much as I want because of severe pain in my neck. F I cannot read at all.	***SECTION 9 - Sleeping*** A I have no trouble sleeping. B My sleep is slightly disturbed (less than 1 hour sleepless). C My sleep is mildly disturbed (1-2 hours sleepless). D My sleep is moderately disturbed (2-3 hours sleepless). E My sleep is greatly disturbed (3-5 hours sleepless). F My sleep is completely disturbed (5-7 hours)
SECTION 5 - Headaches A I have no headaches at all. B I have slight headaches which come infrequently. C I have moderate headaches which come infrequently. D I have moderate headaches which come frequently. E I have severe headaches which come frequently. F I have headaches almost all the time.	***SECTION 10 - Recreation*** A I am able to engage in all of my recreational activities with no neck pain at all. B I am able to engage in all of my recreational activities with some pain in my neck. C I am able to engage in most, but not all of my recreational activities because of pain in my neck. D I am able to engage in a few of my recreational activities because of pain in my neck. E I can hardly do any recreational activities because of pain in my neck. F I cannot do any recreational activities at all.

COMMENTS:_____

_____

_____

NAME: _____ **DATE:** _____ **SCORE:** _____

கழுத்து வலி இயலாமை குறியீட்டு கேள்வித்தாள்

உங்கள் கழுத்து வலி அன்றாட வாழ்க்கை செயல்பாடுகளை நிர்வகிக்க உங்கள் திறனை எவ்வாறு பாதித்துள்ளது என்று நாங்கள் அறிந்து கொள்ள இந்த கேள்வித்தாள் தயவு செய்து எல்லா பிரிவிலும் உங்களுக்கு பொருந்தும் கட்டத்திலும் பதிலளிக்க வேண்டுகிறோம். எந்த ஒரு பிரிவிலும் இரண்டு அல்லது அதற்கு மேற்பட்ட அறிக்கை சரியாக தோன்றின் மிகவும் நெருக்கமாக உங்கள் பிரச்சனைகளை விவரிக்கும் பெட்டியில் குறிக்கவும்.

பிரிவு 1: வலி தீவிரம்

I. எனக்கு இப்போது வலியே இல்லை
II. வலி இப்போது மிகவும் லேசாக உள்ளது
III. வலி இப்பொது மிதமாக உள்ளது
IV. வலி இப்போது கடுமையாக உள்ளது
V. வலி இப்போது மிகவும் கடுமையாக உள்ளது.
VI. வலி இப்போது கற்பனை செய்ய முடியாத மோசமான நிலையில் உள்ளது

பிரிவு 2: தனிப்பட்ட பதுகாப்பு (சலவை, ஆடை அணிதல்)

I. நான் பொதுவக கூடுதல் வலி இல்லாமல் நானே பார்த்துக் கொள்ள முடியும்
II. நான் பொதுவாக என்னை நானே கவனித்துக் கொள்ள முடியும் ஆனால் அது கூடுதல் வலியை கொடுக்கும்.
III. என்னை நானே கவனித்துக் கொள்ள வலியை கொடுக்கும். எனவே கவனமாகவும் மெதுவாகவும் செய்கிறேன்.
IV. எனக்கு சிறிது உதவி தேவைப்படும் ஆனால் எனது தனிப்பட்ட பாதுகாப்பை நானே நிர்வாகித்துக்கொள்கிறேன்.
V. எனது சுய பாதுகாப்பின் பெரும்பாலானவற்றில் தினமும் உதவி தேவை.
VI. நான் கஷ்டப்பட்டு தயாராகவும், கழுவுதல் மற்றும் படுக்கையில் இருக்க வேண்டி உள்ளது

பிரிவு 3: தூக்குதல்

I. கனமான எடையை வலி இல்லாமல் என்னால் தூக்க முடியும்.
II. நான் கனமான எடையை தூக்குவேன் ஆனால் வலி அதிகமாக இருக்கும்.
III. தரையிலிருந்து பொருட்களை எடுக்க வலி ஏற்படுகிறது ஆனால் மேசையில் இருந்து எடுத்துக்கொள்ள முடிகிறது.
IV. கனமான எடைகளை தூக்கும்போது வலி தடுக்கிறது ஆனால் லேசான அல்லது நடுத்தர எடைகள் தூக்கும் வகையில்; வசதியாக அமைக்கப்பட்டிருந்தால் என்னால் நிவகிக்க முடியும்.
V. என்னால் மிகவும் லேசான (குறைவான) எடையை மட்டுமே தூக்க இயலும்.
VI. என்னால் எதையும் தூக்க முடியாது.

பிரிவு 4: படித்தல்

I. கழுத்து வலி இல்லாமல் என்னால் இயன்ற வரை படிக்க இயலும்.
II. என்னால் இயன்ற வரை படிக்கும் போது கழுத்தில் லேசான வலி ஏற்படும்.
III. என் கழுத்தில் மிதமான வலி இருக்கும்போது எவ்வளவு வேண்டுமானாலும் படிக்க முடியும்.
IV. என் கழுத்தில் மிதமான வலி இருக்கும்போது என்னால் இயன்ற வரை படிக்க இயலவில்லை.
V. என் கழுத்து வலியினால் என்னால் கடினப்பட்டு படிக்க முடிகிறது.
VI. என்னால் படிக்கவே முடியவில்லை.

பிரிவு 5: தலைவலி

I. எனக்கு எந்த தலைவலியும் இல்லை.
II. எனக்கு எப்போதாவது லேசான தலைவலி வரும்.
III. எனக்கு எப்போதாவது மிதமான தலைவலி வரும்.
IV. எனக்கு மிதமான தலைவலி அடிக்கடி வரும்.
V. எனக்கு கடினமான தலைவலி அடிக்கடி வரும்.
VI. எனக்கு எப்போதும் தலைவலி இருந்து கொண்டே இருக்கும்.

பிரிவு 6: கவனம்

I. எந்தவித கஷ்டமும் இல்லாமல் என்னால் முழு கவனம் செலுத்த முடியும்.
II. முழு கவனம் செலுத்தும் போது சற்றே கடினம் ஏற்படும்.
III. கவனம் செலுத்தும்போது கடுமையான வலி ஏற்படுகிறது.
IV. நான் கவனம் செலுத்த வேண்டும் போது அதிக கடுமையான வலியால் சிரமம் ஏற்படுகிறது.
V. நான் கவனம் செலுத்த வேண்டுவதில் பெரும் சிரமம் ஏற்படுகிறது.
VI. என்னால் எதிலும் கவனம் செலுத்த முடியவில்லை

பிரிவு 7: வேலை

I. நான் எவ்வளவு வேலை வேண்டுமானாலும் செய்ய முடியும்.
II. எனது வழக்கமான வேலைகளை மட்டுமே என்னால் செய்ய முடியும் ஆனால் அதிகமாக செய்ய முடியாது.
III. நான் என் எல்லா வகையான வழக்கமான வேலைகளையும் செய்ய முடியும் ஆனால் அதிகமாக செய்ய முடியாது.
IV. நான் என் வழக்கமான வேலைகளை செய்ய முடியாது.
V. நான் கடினப்பட்டு வேலைகளை செய்கிறேன்.
VI. என்னால் எந்த ஒரு வேலையையும் செய்ய முடிவதில்லை.

பிரிவு 8: வாகனம் ஓட்டுதல்

I. நான் எந்த கழுத்து வலியும் இல்லாமல் என் மகிழ்வுந்தை ஓட்ட முடியும்.
II. என் கழுத்து லேசான வலி இருப்பினும் எனது மகிழ்வுந்தை எவ்வளவு தூரம் வேண்டுமானாலும் ஓட்ட முடிகிறது.
III. என் கழுத்தில் மிதமான வலி இருப்பினும் என்னால் எவ்வளவு தூரம் வேண்டுமானாலும் என் மகிழ்வுந்தை ஓட்ட முடிகிறது.
IV. என் கழுத்தில் மிதமான வலி ஏற்படும் போது மகிழ்வுந்தை என்னால எவ்வளவு தூரம் வேண்டுமானாலும் ஓட்ட முடிவதில்லை.
V. என் கழுத்தில் கடுமையான வலி இருக்கும் போது மிகவும் கஷ்டப்பட்டு மகிழ்வுந்தை ஓட்ட வேண்டியுள்ளது.
VI. என்னால் மகிழ்வுந்தை ஓட்ட முடிவதில்லை

பிரிவு 9: தூங்குதல்

I. நான் எந்த பிரச்சனையும் இன்றி தூங்க முடியும்.
II. என் தூக்கம் சற்றே கலையும் (1 மணி நேரத்திற்கும் குறைந்த அளவு தூக்கமின்மை)
III. என் தூக்கம் சற்றே அதிகம் கலையும் (1-2 மணி நேரத்திற்கும் குறைந்த அளவு தூக்கமின்மை)
IV. என் தூக்கம் மிதமாக கலையும் (2-3 மணி நேரம் தூக்கமின்மை)
V. என் தூக்கம் அதிகமாக கலையும் (3-5 மணி நேரம் தூக்கமின்மை)
VI. என் தூக்கம் முழுவதுமாக கலைந்துவிடும் (5-7 மணி நேரம் தூக்கமின்மை)

பிரிவு 10: பொழுதுபோக்கு

I. நான் எந்த கழுத்து வலியுமின்றி அனைத்து பொழுதுபோக்கு நடவடிக்கைகளிலும் ஈடுபட முடியும்.
II. என் கழுத்தில் சிறிது வலி இருப்பினும் நான் அனைத்து பொழுதுபோக்கு நடவடிக்கைகளிலும் ஈடுபட முடியும்.
III. என் கழுத்து வலியால் எல்லா வழக்கமான பொழுதுபோக்கு நடவடிக்கைகளிலும் ஈடுபட முடியாது ஆனால் ஓரளவு அதிகமாக ஈடுபட முடியும்.
IV. என் கழுத்து வலியால் ஒருசில வழக்கமான பொழுதுபோக்கு நடவடிக்கைகளில் மட்டும் ஈடுபடமுடியும்.
V. நான் கஷ்டப்பட்டு எனது பொழுதுபோக்கு நடவடிக்கைகளில் ஈடுபட முடிகிறது.
VI. என்னால் எந்த வித பொழுதுபோக்கு நடவடிக்கையும் செய்ய முடிவதில்லை

கருத்துக்கள்: _____

_____

பெயர்: _____ தேதி: _____/_____/_____ மதிப்பெண்_____

ANNEXURE V

TREATMENT PROTOCOL

EFFICACY OF SCAPULAR STABILIZATION EXERCISES IN PATIENTS WITH MECHANICAL NECK PAIN

Group A: Scapular Stabilization Exercises

Treatment duration – 30 minutes

5 MINUTES- WARMUP EXERCISE

- Neck movements
- Shoulder bracing
- Shoulder shrug
- Trapezius stretching
- Pectoralis stretching

20 MINUTES- SCAPULAR STABILIZATION EXERCISE

- Scapular retraction
- Eccentric scapular retraction
- Combined scapular retraction with shoulder lateral rotation
- Forward punch
- Dynamic hug

5 MINUTES- COOLDOWN EXERCISE

- Neck movements
- Shoulder bracing
- Shoulder shrug

Group B: Conventional Physiotherapy

Treatment duration – 30 minutes

- **Active exercise-** 10 repetitions in all direction in pain free range.
- **Isometrics**- 5 to 10 second's brief but maximum contraction each held 5-16 seconds for flexors, extensors and side flexors.
- **Moist hot or cool packs:** sitting position for 15 minutes on cervical region with head resting on table with a pillow.

EXERCISE PROTOCOL

❖ WARM UP AND COOL DOWN EXERCISES:

1. NECK MOVEMENTS:

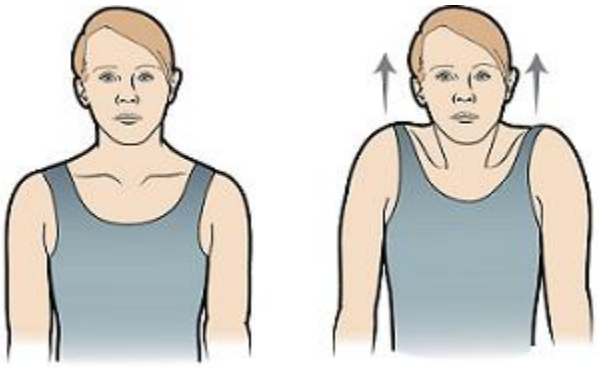
Active neck rotation

Active neck sidebend

Neck flexion

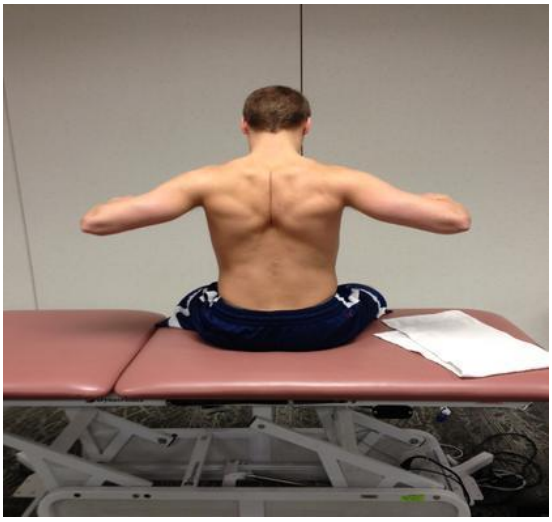
Neck extension

2. SHOULDER SHRUGS



Stand erect and arms at side. Elevate only the shoulders as high as possible and hold it for 2-3 seconds. Then slowly lower your shoulder to original position.

3. SHOULDER BRACING




Stand erect. Shoulders abducted to 90º and elbows flexed slightly. Now move the hands across the chest forwards and then backwards as much as possible.

4. TRAPEZIUS STRETCHING

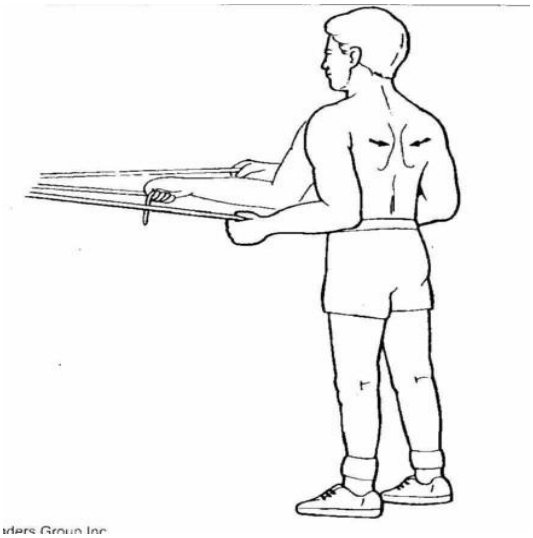

Standing or sitting erect. For right side trapezius stretch lower your left ear towards your left shoulder. To prevent the lifting of the right shoulder the right hand is placed behind your back or hold the chair behind. Now using your left hand gently press your head and hold it for 30-40 seconds. Then slowly release the stretch and get back to original position. And repeat the same manner to the right side.

5. PECTORALIS STRETCHING

Stand at the corner of the wall or at the door step. Shoulders are abducted to 90º and elbow to 90º now place the forearm on each side of the door step. Slowly lean forward or shift your weight forwards. Hold it for 20-30 seconds. Then slowly release the stretch and get back to original position.

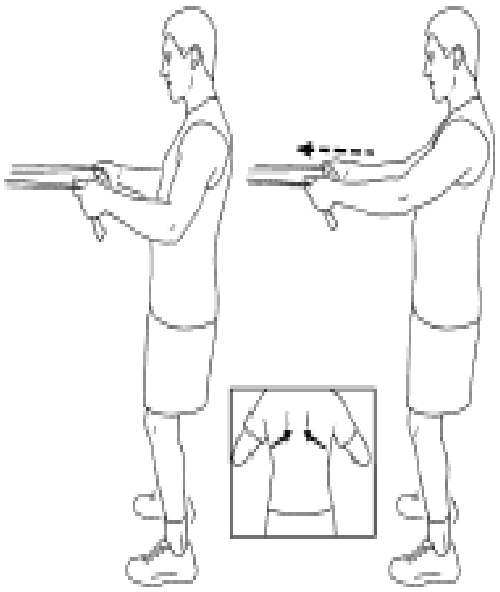
❖ SCAPULAR STABILIZATION EXERCISES:

1. SCAPULAR RETRACTION:



Stand erect grasp the band between your hands and arms lifted out to the sides with elbows at 90° and slow pull arms backwards and squeeze the shoulder blades together. Hold it for 6-10 seconds and slowly return to the starting position.

2. **ECCENTRIC SCAPULAR RETRACTION:**



Stand erect by holding the end of band in each hand. Pull back until elbows are even with trunk and keep elbows out from sides at 45°, thumbs up. Hold it for 6-10 seconds and slowly release and get back to starting position.

3. **COMBINED SCAPULAR RETRACTION WITH SHOULDER EXTERNAL ROTATION:**

Stand erect with band looped around your hands about shoulder-width apart, elbows 90° flexed. Squeeze your shoulder blades together, gently stretching the band between your hands. Hold it for 6-10 seconds and slowly return to a starting position.

4. **FORWARD PUNCH:**

Stand erect with band wrapped around your mid back. Grasp the ends of the band in front of you with your elbows bent at your side. Extend your elbows forward and push the band away from your trunk. Hold it for 6-10 seconds and slowly return to starting position.

5. **DYNAMIC HUG:**

Stand erect, place the band around your upper back and adjust your hands as an open handed grip and palms are prone. Abduct your shoulders about 60° and bend your elbows about 45°. Keeping your arms raised and in position, push your arms forward and inward when your hands cross each other. Hold for 6-10 seconds and slowly return to starting position.

ANNEXURE VI

ABSTRACT

EFFICACY OF SCAPULAR STABILIZATION EXERCISES IN PATIENTS WITH MECHANICAL NECK PAIN

Background: Neck pain is the fourth leading causes of disability, with an annual prevalence rate exceeding 30%. Mechanical neck pain is abnormal stress and strain on muscles of the vertebral column that does not radiate into the arms or upper extremities and is also called Axial Neck Pain. It commonly arises insidiously and is generally physical and psychosocial contribution which is multifactorial in origin including one or more of the following: poor posture, anxiety, depression, neck strain and sporting or occupational activities. The previous research and the emerging evidences states that Scapulothoracic Muscle weakness is found to be a causative factor in the pathogenesis of Mechanical Neck Pain. There are literatures which proven that the Scapular Stabilization Exercises in neck pain reduction and to improve the functional status.

Objective: To determine the efficacy of Scapular Stabilization Exercises in reducing pain and improving functional status in Mechanical Neck Pain patients.

Design: A QUASI experimental study design (pretest and posttest design)

Setting: Orthopaedics department and Out-patient Department of Physical Medicine and Rehabilitation, P.S.G Hospital, Coimbatore.

Participants: 30 patients with Mechanical neck pain.

Interventions: Group A received Scapular Stabilization Exercises and Group B received Conventional physiotherapy. Visual Analogue Scale (VAS) and Neck Disability Index (NDI) were used as **outcome measure** of pain and activity limitation and disability.

Results: The calculated paired‘t ’ test values for VAS of group A is 9.9 and group B is 19.9 which is greater than the table value indicating there is a significant difference within both the groups. The value of independent‘t ’ test for both groups are 1.6 which is less than the table value indicating there is no significant difference between the groups. The calculated paired‘t ’ test values for NDI of group A is 20.5 and group B is 19.0 which is greater than the table value indicating there is a significant difference within both the groups. The value of independent‘t’ test for both groups are 4.3 which is greater than the table value indicating there is a significant difference between the groups.

Conclusion: Thus the statistical analysis of data concluded that **“Scapular Stabilization Exercises shows statistically significant improvement in functional status compared to Conventional physiotherapy, whereas there was statistically no significant difference between Scapular Stabilization Exercises and Conventional physiotherapy in pain”.**

Keywords: Mechanical neck pain, scapula biomechanics, Scapular stabilization exercises.